



Leg Ulcers

What is a leg ulcer?

A leg ulcer is a breakdown in a portion of the skin covering the lower limb with the resultant formation of a wound or sore. These often occur following a relatively minor injury e.g. insect bite or blister and heal quickly with minimal medical input. However, individuals with underlying medical conditions which make them less likely to heal a wound may go on to develop a chronic leg ulcer (an ulcer that fails to heal within six weeks despite treatment). Chronic leg ulcers (CLU) may extend with time into the underlying fat, muscle and bone, particularly if they become infected, significantly impacting on the well-being of the individual.

How common is chronic leg ulceration and who does it affect?

The overall annual incidence of CLU in the UK is 3-4 cases per 1000 people. CLU tend to affect the older adult population but can occur in both young adults and children. It is estimated that 2% of those aged over 60 years and 5% of the those aged over 80 years suffer with a CLU. As a result of an ageing population and increased incidence of CLU risk factors, e.g. diabetes & obesity, the incidence of CLU is increasing and it is estimated that »10% of the population will suffer with a CLU at some stage during their lifetime.

What are the underlying reasons why a chronic leg ulcer develops?

In order to maintain the viability or heal a segment of skin and associated underlying tissues certain fundamental biological requirements need to exist:

1) All tissues need a good blood supply (arterial circulation) to deliver nutrients e.g. oxygen. Any condition that compromises the blood supply, e.g. peripheral arterial disease or diabetes, increases the risk of CLU.

2) Tissues require the blood that is delivered through the arterial circulation to be returned through a functional venous system in order to remove waste products e.g. CO₂. Varicose veins and deep venous insufficiency, e.g. following DVT, prevent the efficient drainage of blood from the leg and increase the risk of CLU.

3) Tissues require a defence mechanism to prevent infection and injury. This defence mechanism in the lower leg is mainly made up of the skin and its ability to detect pain through its sensory nerve supply. The majority of ulcers initially occur following a minor injury to the skin e.g. stepping on a nail. Whereas healthy individuals will be aware of their injury and thereby take steps to prevent/protect the leg e.g. pulling your foot away from a hot radiator, patients with

nerve damage (neuropathy) may be unaware the injury is occurring until significant damage has occurred. The commonest cause of ulceration due to neuropathy is diabetes (see diabetic foot ulceration)

4) Tissues need to be structurally normal. Malignancy and conditions that affect the underlying design of the tissue, e.g. connective tissue disorders, may lead to CLU.

What are the commonest causes of Chronic Leg Ulceration?

Any disease process which upsets any of the aforementioned biophysiological requirements for tissue survival increases the risk of an individual going on to develop a chronic ulcer following a skin wound. (See table 1).

In the western world CLU is mainly caused by venous insufficiency (>70%). Peripheral arterial disease (arterial insufficiency), neuropathy (predominantly diabetes related) or a combination (mixed aetiology) account for the majority of remaining cases.

The remainder of this section refers to venous CLU. For information on peripheral arterial disease, critical limb ischaemia and diabetic foot ulceration please refer to the relevant sections.

How does venous insufficiency cause ulceration?

The venous circulation of the lower leg is split into two major systems: Deep venous system and Superficial venous system. The deep veins run next to the arteries in the center of your leg whereas the superficial veins run just beneath the skin. Venous flow progresses from the superficial veins to the deep veins through either perforating (bridging) veins or through one of two junctions – saphenofemoral junction (in the groin crease) or saphenopopliteal junction (behind the knee).

Return of the blood from the deep veins to the pelvis/abdomen and then to the heart is not as a result of the heart pump but as a result of the calf muscles contracting –calf muscle pump. As the calf muscles contract a pressure gradient develops allowing the blood to flow from the legs into the pelvis. The deep and superficial veins have valves that prevent back flow of blood during muscle relaxation. Any failing (insufficiency) within this complex pathway results in higher pressure within the veins (venous hypertension) leading to leakage of blood components out of the veins into surrounding tissues. The resultant inflammatory reaction damages the skin and underlying fat increasing the risk of developing CLU following a minor injury.

How do varicose veins cause ulceration?

Varicose veins are caused by non-functioning valves within the superficial veins. This results in high pressure within the veins with resultant leakage of blood components into the skin and tissues. With time the skin becomes chronically inflamed and damaged increasing your risk of CLU. (See separate varicose veins information sheet)

I have had a scan and told my superficial and deep veins are normal, can I still have a venous cause for CLU?

Yes; a common factor influencing the development of venous CLU is calf muscle pump failure. Any condition that decreases the ability or frequency of the calf muscles to contract and relax can perpetuate venous CLU. These include immobility and ankle damage e.g. arthritis. Furthermore, any condition that impacts on the size of the pressure gradient between your calf and pelvic veins the calf muscles are able to generate can also cause calf muscle pump failure. Typically, this is as a result of compression of the pelvic veins, e.g. obesity, pregnancy, or damage to the pelvic veins themselves following trauma, surgery, congenital conditions (see May-Thurner syndrome information leaflet) or venous thrombosis.

How are venous leg ulcers diagnosed?

The diagnosis is made based on an accurate history taking and physical examination in combination with targeted investigations. Blood flow assessment –both arterial and venous due to an often mixed aetiology- is critical in the assessment of venous leg ulcers.

Investigations you may undergo dependent on the clinical picture include:

1. Ankle brachial pressure index
2. Bacterial culture: If an infection is suspected a biopsy or scraping of the ulcer bed may be used to confirm infection and identify the infecting organism and its sensitivity/resistance to antibiotic types.
3. Biopsy: Ulcer biopsy is important to confirm the diagnosis and rule out malignancy as some CLU are prone to malignant change (e.g. Marjolin ulcer). Biopsies are performed under local anaesthetic in the clinic environment in most cases.
4. Blood analysis
5. CT angiogram/venogram
6. Duplex Doppler ultrasound examination of your arterial tree
7. Duplex Doppler ultrasound examination of your deep and superficial venous systems
8. MR angiogram/venogram

What are the general principles of treating CLU?

The treatment of CLU often presents a therapeutic challenge. The treatment of the underlying cause, e.g. improving blood supply, should have priority and be undertaken simultaneously with local treatment of the ulcer e.g. dressings, infection control.

How are venous CLU treated?

Reversing the high pressure within the veins and local ulcer management are the two mainstays of successfully treating venous CLU:

1) A number of treatment strategies may be incorporated into your care plan to reverse the high pressure within the leg veins. These include:

Leg elevation such that your heel is higher than your hip with the leg straightened reduces the pressure within the leg veins through the effects of gravity. Thus, when sitting down clients are encouraged to elevate their legs on a stool; similarly, at night elevating the foot of the bed such that your foot will aid in ulcer healing.

Compression bandaging or compression stockings reduce the pressure within the leg veins when standing. The majority of clients will require compression bandaging initially with several layers of bandages applied in order to achieve pressure control. These will need to be changed regularly (sometimes daily) due to weeping of the underlying ulcers; as pressure control is achieved the degree of ulcer weeping diminished and thus the frequency of bandaging change diminishes. Once the ulcer is healed a custom fitted compression stocking is applied to prevent recurrence.

Surgery may be recommended where an underlying vein anomaly is identified and amenable to surgical correction, e.g. varicose veins, pelvic vein narrowing. In the majority of cases we prefer to attain ulcer healing with 'compression and elevation' before offering definitive treatment for underlying venous insufficiency. However, in some cases concomitant treatment of the underlying cause may expedite the healing of stubborn venous ulceration. (See Varicose veins and May-Thurner syndrome information leaflets)

2) Local Ulcer Management

Infection control is paramount to attain ulcer healing. This may be achieved through a combination of systemic antibiotics, local antimicrobial dressings and regular washing of the ulcer with an antiseptic solution e.g. potassium permanganate.

Ulcer dressings are an important aspect of ulcer care with a plethora of dressing available on the market. There is very little or no clinical evidence to support one dressing type over another despite the adverts you may read. We firmly believe in evidenced based medicine and in our experience a simple atraumatic, absorbent dressing is often sufficient to control the ulcer whilst the underlying cause is addressed.

Skin grafting, on rare occasions, may be used to facilitate healing of ulcers that have failed to heal despite adequate treatment of the underlying cause.

How can I prevent a venous CLU recurring?

Venous ulceration is a chronic disease characterized by cycles of deterioration and remission. Venous ulcers often take a long time to heal and thus once healing has been achieved ensuring recurrence is vitally important; it is often more difficult to heal a recurrent ulcer than a primary ulcer.

The mainstay of preventing ulcer recurrence is to adequately treat the underlying cause. This may consist of simple yet important lifestyle changes, e.g. weight loss, increased physical activity, lifelong compression stockings, or surgery to treat superficial venous or deep venous disease.



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